



# Spectral Gamma-Ray Borehole Log Data Report

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Borehole

# 10-03-04

Log Event A

## Borehole Information

Farm : <u>A</u>	Tank : <u>A-103</u>	Site Number : <u>299-E25-80</u>
N-Coord : <u>41,180</u>	W-Coord : <u>47,558</u>	TOC Elevation : <u>687.54</u>
Water Level, ft :	Date Drilled : <u>4/30/1962</u>	

## Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>125</u>	

## Borehole Notes:

Borehole 10-03-04 was originally drilled in April 1962 to a depth of 75 ft with 6-in. casing. In May 1978, an 8-in. casing was drilled over the existing 6-in. casing to a depth of 18 ft and the 6-in. casing was drilled to a depth of 130 ft. The bottom 5 ft of the 6-in. casing was grouted, and the annular space around the 6-in. casing was grouted as the 8-in. casing was backpulled.

The 6-in. casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. The driller's log does not indicate that the casing was perforated. The top of the casing, which is the zero reference for the SGLS, is about even with the ground surface.

## Equipment Information

Logging System : <u>2</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1996</u>	Calibration Reference : <u>GJO-HAN-13</u>	Logging Procedure : <u>P-GJPO-1783</u>

## Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>10/14/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>8.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>2</u>	Log Run Date : <u>10/15/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>121.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>53.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>3</u>	Log Run Date : <u>10/16/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>55.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>7.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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**Logging Operation Notes:**

This borehole was logged in three log runs. The total logging depth achieved by the SGLS was 121 ft.

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**Analysis Information**

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Analyst : D.L. Parker

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 03/04/1998

**Analysis Notes :**

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A casing correction factor for 0.280-in.-thick casing was applied to the log data during the analysis process.

Shape factor analysis was applied to the SGLS data and provided insights into the distribution of Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

**Log Plot Notes:**

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data. A plot of the shape factor analysis results is included. The plot is used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.

**Results/Interpretations:**

The only man-made radionuclide detected in this borehole was Cs-137. Cs-137 contamination was detected almost continuously from the ground surface to 20.5 and from 77.5 to 86.5 ft. Single detections of Cs-137 also occurred at depths of 51 and 74.5 ft.

The plot of naturally occurring radionuclides shows K-40 concentrations are decreased from about 2.5 to 16 ft. K-40 background concentrations increase gradually from a background concentration of about 9 pCi/g to about 12 pCi/g between 16.5 and 20.5 ft. KUT concentrations increase significantly at a depth of about 115 ft.

An analysis of the shape factors associated with applicable segments of the spectra was performed. The shape factors provide insights into the distribution of the Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.



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Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank A-103.